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ARCHIVES OF PEDIATRICS

A MONTHLY DEVOTED TO THE

DISEASES OF INFANTS AND CHILDREN

JOHN FITCH LANDON, M.D., Editor

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1. Grayzel, H. G., Heimer, C. B., and Grayzel, R. W.: New York St. J. Med. 53:2233, 1953. 2. Heimer, C. B., Grayzel, H. G., and Kramer, B.: Archives of Pediatrics 68:382, 1951. 3. Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Ind. Med. & Surgery 18:512, 1949. 4. Turell, R.: New York St. J. Med. 50:2282, 1950. 5. Marks, M. M.: Missouri Med. 52:187, 1955.

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(1) Wilson, J. L., and Dickinson, D. G.: J. A. M. A. 158: 261, 1955.

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CONTENTS

ORIGINAL COMMUNICATIONS

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(Continued on page 4)

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*Smessaert, André; Collins, V.J.; and Kracum, V.D.: *New York Jour. Med.*, 55:1587, June 1, 1955.

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(Continued from page 2)

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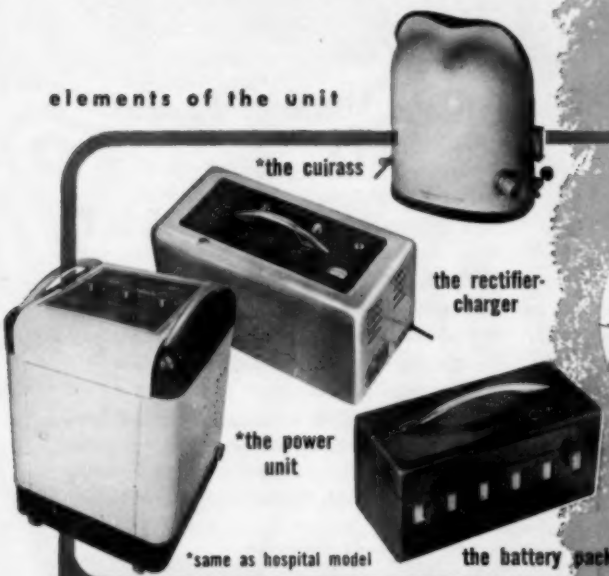

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ARCHIVES OF PEDIATRICS

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JOHN FITCH LANDON, M.D., Editor

TREATMENT OF CONGENITAL ACROMICRIA SYNDROME IN CHILDREN*

HYMAN GOLDSTEIN, M.D., Sc.D.
New York.

The evolution of knowledge concerning the treatment and management of congenital acromicria syndrome in children has made important strides forward within the last decade. Classification of these children under the terms Mongolism, or Mongolian idiocy is unfair. Very few of the affected children are idiots. The latter are chiefly neglected or untreated cases of mongolism. The mongolian children are normal children of the Mongolian race, who inhabit a vast region of Central Asia. Mongolian idiocy is, therefore, a misnomer and stigmatizes the child. It tends also to create "a do-nothing attitude" among the attending physicians and clinics as soon as a diagnosis is made of Mongolian idiocy. Congenital acromicria syndrome describes the pathology and the disturbed physiology of the retarded child in that in growth and development, the little patient is small or partially dwarfed in body and mind. Having a sick baby or child to care for, we must treat it in the best way we know.

The children are immature in body build, in most of their organ and brain development, and in their bodily and mental functions and/or responses. The therapeutic indications, therefore, are for us to apply therapeutic agents which will help to mature the immature growth, development and mental responses of the congenital acromicria syndrome child.

The treatment for this condition can be divided into seven sec-

*Lectures delivered April 6 and 9, 1956 at the University of Panama, Republic of Panama.

tions. 1. Prophylaxis; 2. Endocrine, and combined endocrine and glutamic acid therapy; 3. Speech and physical therapy; 4. Brain surgery; 5. Proper nutrition, drugs, minerals and vitamins; 6. Sicca-cell therapy; 7. Psychological guidance and education.

1. *Prophylaxis.* Engaged couples, contemplating marriage, should consult their physician regarding their health, their blood Rh and grouping; after marriage, the wife should have a physical gynecological check-up, and the husband's semen should be examined for quantitative and qualitative spermatozoan counts. They should obtain, in addition, proper prenatal information, especially when the wife is pregnant. The physician supplying the prenatal information should possess knowledge of endocrinology, genetics and nutrition.

It is customary, today, for women to work, or be in business, that is, have some career, and because of this, there is a tendency to postpone pregnancy into the risk priod. Child spacing is preferred and safe between 2½ and 4 years, and should not be carried beyond 5 years. A long sterile period is risky. The pregnant woman's age is important. Women past 40 years of age should try to avoid becoming pregnant; if they do become pregnant, proper therapeutic help may increase the possibility of having a normal baby at term. The risk age, however, is between 35 years and 39 years of age, during which most congenital acromicria syndrome babies are born. Women with a history of menstrual difficulties and prior miscarriages indicating maladjustment of their endocrine system, require the adjustment of their ductless gland secretions by determining the faulty functions, and correcting them with proper endocrine therapy. If an expectant mother comes in contact with, or contracts a contagious disease, the virus may filter through the placenta and affect the developing fetus. Intramuscudar injection of immune globulin under such circumstances may prevent the virus from spreading to and infecting the fetus. It is also important that the attending physician have prior knowledge of the pregnant woman's, as well as her husband's blood Rh and blood grouping, which, if such incompatability be found, will alert him in his care with happy results for the mother and baby.

In accordance with prior studies of nutritional research during pregnancy, the author[1] has found a high pediatric rating for the

newborn babies of mothers who received a daily intake of 85 grams to 100 grams protein in their diet during their pregnancy and, he reports, the lowest percentage of congenital acromicria syndrome babies. Sufficient calories, vitamins, especially the fat soluble vitamins and minerals are essentials also. Thus, proper prenatal care for the pregnant woman, with directives which tend to strengthen her reproductive organism, will, in many instances, prevent an abnormal pattern of fetal growth and development in utero.

2. *Endocrine Therapy.* Chronic inadequacy of hormone production is a common factor in congenital acromicria syndrome. Adequacy of pituitary, thyroid, adrenal, and gonodal gland hormones are necessary in the combination of mineral and vitamin, supplementing, especially, the fat soluble vitamins with a proper daily diet to ascertain greater growth and developmental promotion values. In order to secure the fullest benefit for the body development as well as better mental responses, we must obtain normally functioning or improved ductless gland activity, upon which depends adjusted metabolic processes and vitamin utilization, and electrolyte concentration from mineral intake. Problems of fluid and electrolyte imbalance are more common in infants and children, and even more so in children affected with congenital acromicria syndrome because of endocrine insufficiency. The urine Sulkowitch test, in the majority of these children, shows a marked calcium deficiency which is quickly replenished by the proper diet, glandular and vitamin therapy, and supplements of calcium intake. Th two prominent divisions of cases of congenital acromicria syndrome are those in which the thyroid gland deficiency predominates, such as in children who evidence an I.Q. higher than 50 per cent, of shorter stature, wider facial features and hypertelorism, more myxedematous skin, and pudgy, short hands and feet, and greater atonicity of muscles with more awkward motivity and gait. These cases respond more rapidly to endocrine therapy, and more especially to the optimum thyroid and glutamic acid therapy, and sicca-cell therapy which I will describe later in this article; and those in whom the pituitary gland deficiency is most marked as evidenced by taller, thin stature, the more incurved little finger, low I.Q. levels, speech difficulty, and, in many instances, no speech at all, restlessness, and a greater degree of emotional dis-

turbances, as well as of heart and organ anomalies. Although these cases are more difficult to treat, the correct approach, therapeutically, and understanding the etiology and pathology of the condition can help to improve the child's intelligence level, motivation, body development and growth, environment awareness, learning and training ability. All children who suffer from congenital acromicria syndrome should receive proper medical care, should be prepared physically and improved in mental receptiveness and responses so that the psychologist and teacher has better children to work with. Immaturity of the gray and white matter of the crowded and compressed brain, and moderated degrees of nerve tract demyelination form the basis of the child's retarded responses. Our therapy in all its phases is directed towards maturation of the immature brain, other areas of the central nervous system, and other bodily organs in growth, development, and all physiological responses.

During the first three months of life, as soon as the diagnosis of congenital acromicria syndrome is made, I prescribe 1/60th grain thyroid extract, 1/30th grain whole pituitary gland, 1/15th grain adrenal gland substance, ¼ grain saccharated carbonate of iron, and 5 grains calcium gluconate in powder form, giving the child one powder in the 10 A.M. bottle, and one powder mixed into the 6 P.M. bottle. The thyroid extract is increased by 1/15th grain until tolerance is reached. From 6 months to 1 year of age, I start the child with 1/30th grain thyroid, 1/15th grain pituitary, 1/10th grain adrenal gland, and ½ grain saccharated carbonate of iron, and 5 grains calcium gluconate, twice daily, and increase the thyroid extract by 1/10th grain weekly until tolerance or optimum doses are reached. From 1 year to 1½ years of age, I increase the thyroid extract to 1/10th grain, twice daily, and increase the dosage by 1/10th grain daily every week until tolerance is reached. From 1½ years to 4 years of age, the dosage is 1/8th grain thyroid extract twice daily, and increase the dosage weekly by 1/8th grain until tolerance point. From 4 years to 8 years of age the children receive ¼ grain to ½ grain thyroid which is increased weekly by ¼ grain daily until optimum dosage is reached, and over 8 years of age, they are started on a ½ grain thyroid, increased weekly by ¼ grain thyroid daily until tolerance is reached. The tolerance point is recognized when the child becomes rest-

less, acts cranky, fretful and nervous, cries a great deal, cannot sleep, eats poorly, and feels tremulous. The last dose of thyroid extract prior to the one given when these symptoms arise is the tolerance point or optimum thyroid dose for the child. The optimum thyroid dose is to be continued over a long period of time. Should the toxic symptoms become evident again after a period of time under thyroid therapy, the dose should be lowered once again to the previous effective dose. Children from 2 years to 4 years of age suffering from the more severe pathological pituitary type case of congenital acromicria syndrome received, in addition to the thyroid therapy, ½ grain to 1 grain anterior pituitary extract daily, and children from 4 years of age and over received 2 grains daily. The affected children who gave evidence of hypogonadism and cryptorchism received intramuscular injections of the anterior pituitary like factor (500 units) twice to three times weekly. After the undescended or undeveloped testis can be felt improved in size and lowered into the scrotum, the anterior pituitary like factor injections will no longer be necessary, and instead, testosterone may be administered orally until satisfactory development of the testis is in evidence. Of course, any suspicion of breast enlargement, when observed, is an indication to stop male hormone therapy in order to avoid gynecomastia as a complication. When enuresis, in older children, becomes a troublesome complaint, I usually add 1/10th grain posterior pituitary gland extract, and 2/3 grain to 3/4 grain ephedrine in capsule form once daily, for one week, given at bed time. In most instances this condition clears up.

In 1949, Armour & Co. supplied me with liberal quantities of immature animal (calf) whole pituitary gland powder in one grain capsules for a clinical research study, in treating congenital acromicria syndrome cases by administering one capsule daily to each child. The theory for this therapy is based on the fact that immature animal pituitary gland retains the active growth factors. In the author's[2] experience as outlined in a previous report, he found that the congenital acromicria syndrome showed the greatest improvement in children treated with a combination of optimum doses of thyroid extract, 1 (+) glutamic acid, and one capsule pituitary calf whole gland powder daily. At the beginning of the treatment, the children showed a low health and growth grid

which improved steadily with the glandular and glutamic acid therapy. Most of the children were considered "rejects" elsewhere, by their attending physicians and in clinics, and received practically no therapy except for an attempt at psychological guidance, physiotherapy, and a sampling of speech therapy before they were referred to me. And, therefore, I consider these children, who had I.Q.'s of 30 to 47, and a few with a higher I.Q., as controls. Many of the children presented a distended abdomen with celluloid tenseness and pain, yet soft and flaccid, indicating a weakness of the intestinal and abdominal muscles. Constipation and constipated stools were common among them. Small doses of pituitary whole gland and suprarenal gland substance relieved the pain, also abdominal distension and their constipation to a great extent. This is a definite indication that the glandular products are not completely destroyed by the gastric or intestinal ferments, that a good portion of them is absorbed and utilized and have favorable therapeutic values. Animal experimentation does not always prove pharmaceutically the efficacy of medical products. Its failure in animal responses, physiologically tested may be a success when used in human experiments, and vice-versa. Different animals react differently, too. Utilizing this knowledge, we may progress much further therapeutically using both, correctly evaluating our animal experimentation, and our investigations of the human being using therapeutic agents in clinical research. The relief brought to the above-mentioned children, to their abdominal symptoms, and their constipation, is due to the improved functions of the autonomic nervous system by the pituitary and suprarenal gland extracts in balancing the sympathetic-parasympathetic impulses.

Zimmerman and Ross[3], in 1944, demonstrated that white rats fed l (+) glutamic acid could solve a simple maze problem faster than a control group. Zimmerman[4] and coworkers, in 1949, in their cases of congenital acromicria syndrome, obtained mental acceleration from 5½ to 11 points in I.Q. ratings. The dosage of l (+) glutamic acid is from 20 grams to 30 grams daily. Some of the children could take even larger doses. Its taste is masked by mixing it with apple juice or sauce, jams, jellies, or other fruit juices. Quin and Durling[5], Gilbert[6] and Bossman[7], and Sister Maureen[8] found with the administration of glutamic acid significant improvement in the children's higher I.Q. The author[2] found

even greater improvement in the intelligence ratings of the children in administering glandular therapy with the 1 (+) glutamic acid. A case in point is the patient, B.N., female, 10 years of age, referred to me when she was 13 months old. She had marked mongoloid features, her muscles were atonic and flaccid, with marked mental retardation, and physiologically, very immature, with patent foramen ovale and murmurs heard all over the precordia. This child was rejected by her pediatrician and others, and the mother was disheartened because she had been told her child could not be helped and should be institutionalized. Upon physical examination, I found the child to be a case of congenital acromicria syndrome, as described above, with thyroid gland deficiency predominating. I told the mother that her baby was a sick child, who required treatment which would improve her condition considerably. The mother, buoyed up in spirit, replied that she would cooperate in every way possible, and being a former school teacher, she proved to be of great assistance. The baby was placed on the therapy schedule of 1 year to 1½ years, as outlined previously in this article. At the age of 3 years, she received 1 grain pituitary calf immature whole gland powder daily, in addition to the optimum doses of thyroid extract and glutamic acid. At 5 years of age, she was taking 8 grains thyroid extract and 8 tablespoonfuls glutamic acid daily. We tried her on smaller doses, and found she could not concentrate as well, she became restless, and I had to increase the dose to 8 grains of thyroid and 8 tablespoons glutamic acid for optimum results. She was taking increased doses of fat soluble vitamins and minerals, a high protein and moderate carbohydrate, with low fat, daily diet. She was also getting alpha tocopherols equivalent of 50 mgm. daily which helped tone up the voluntary muscles. It also stimulated her, generally to a greater feeling of well being. She received physical training and rhythmic dancing lessons. She coordinates muscular actions, motivation, and gait well. Her I.Q., performance, adaptability, physical and social maturity ratings were raised 50 to 75 per cent. Her growth and development matured, very closely approximating the normal. The heart anomaly is the same (congenital lesion), but the heart compensation to exercises which are quite strenuous, and to normal living, is normal. Her continued progress is shown by the following report cards for her class work in a private school, and for her Sunday school work.

October 22, 1952: B.N., Grade 1, class 237, Suburban School for Tutoring. Age 6 years. Oral reading skills 90; Fundamental arithmetic processes 80; English 80; Speech 70 per cent.

October 22, 1953: B.N., Oral reading skills, 100 per cent; Vocabulary 95 per cent. Oral English 90; Comprehension 95; Arithmetic processes 95; Speech 85; Community awareness 85; Acuracy speed 95; Written English 90, Spelling in use in daily work 95 per cent. Emotionally, quite stable. Promoted.

Social record: Intelligence maturity, fair; Emotional maturity, good; Concentration, good; Interest, good; Neatness, good; Self discipline, fair; Initiative, very good. Teacher remarks: "Academic progress and accomplishments upon completion of the first grade for B.N. would be a good average in any school.

Her religious report from Sunday school is of equal standing in religious history and prayers. Mixing and playing with normal children has done B.N. a great deal of good. She plays the piano, dances well, and is very good in calisthenics. It has improved her poise and personality.

B.N. had her urine examined at the Abderhalden Endocrine Laboratory in Switzerland and it showed mild deficient functions attributable to the hypothalamus and pituitary gland, and a stronger reaction of the thyroid. The brain areas showed normal findings in the urine, indicating normal funtcioning of the lobes of the brain. On May 11, 1955, June 14, and June 22, 1955, she received intramuscular injections of sicca-cells of hypothalamus, pituitary gland, and thyroid gland under strictly surgical antisepsis. Ringers solution is used to dissolve the sicca-cells. In a later article, which will be published in a future issue of the Archives of Pediatrics, I will explain the Abderhalden endocrine urine tests, and also the Niehans sicca-cells therapy, and indications thereof. Since B.N. received the sicca-cell therapy, she improved in intelligence, power of mental concentration, social adjustment, and maturity in a general way, so that she spent the summer in a camp, without any medication or therapy, and got along splendidly in all activities, such as swimming, acting, and art-crafts. When she returned to the city, she contracted an upper respiratory infection following which she was left weak and could not concentrate as well. I had her take 1 grain thyroid and 1 tablespoon of glutamic acid daily, later increased it to 3 grains

thyroid and 3 tablespoons glutamic acid daily. On May 2, 1956, I injected her with another dose of thyroid sicca-cell. She is getting along splendidly.

Very important is the fact that we are now able to improve these children, physically and mentally, and mature their understanding and development so that they are better prepared for education, training and psychological guidance. They are better molding material for the attendants when the little patients have stronger bodies and improved minds to develop.

3. *Speech and Physical Therapy.* Speech is a means of communication, of one person with another; language is the spoken word, guttural sounds, or hand and lip signs, that makes man to man communication possible. The mentally retarded child possesses limited speech and limited language. Speech therapy should be made available to every child who needs this service. Hearing and vision defects should be spotted and treated. Hearing aids may be necessary for some. There is a great need for qualified speech therapists as well as qualified physical therapists. Physical training with the use of proper equipment to help the retarded children develop good posture, normal gait, confidence through rhythmic dancing and calisthenics, poise and personality is important.

4. Brain Surgery. The problem of the severely, pathologically affected congenital acromicria syndrome child is a complex one. It is a difficult task for the parents and even for the doctor to cope with many of the situations that arise therefrom, and it is often very difficult to arrive at a decision of procedure. Surgery may have to be resorted to as the only way to help. Indicated cases must be selected carefully. Two cases in point are the following:

Case 1. R.C.T., male, 8 years old, however, no bigger in stature than a 3-year-old child. He is a case of congenital acromicria syndrome with marked mongoloid features. He lost his eyesight following pneumonia which lasted six weeks. This was followed by convulsions with projectile vomiting and a comatose state. The convulsions recurred once weekly. The last convulsion resulted in status epilepticus which was terminated with great difficulty. He was mildly microcephalic, and could not talk nor walk. He had to be fed through hypodermoclysis because he could not and would not eat. X-ray revealed a small skull and

marked platybasia. Diagnosis was made of a pituitary type of mongolism or congenital acromicria syndrome with platybasia. Dr. Samuel Rosner[9] decided to operate. The occipital bone was removed to decompress both cerebellar hemispheres. The dura was opened in a V shape on both sides and left open. The brain was bluish and pulseless from pressure which changed to a healthy pink color soon after the pressure was removed and the brain began to pulsate again. Postoperatively, the follow-up revealed great relief from headaches and epileptic seizures. They were fewer and mild. R.C.T. stands and walks now. After 1½ years, his growth accelerated 50 per cent. He is more attentive, playful, attempts to talk, and appreciates humorous television incidents.

Case 2. The second case of congenital acromicria syndrome concerns a 16-year-old boy with a mentality of a 4-year-old. He played with rattles and wood blocks seated on the floor. He had a marked mongoloid appearance, small nostrils, great breathing difficulty and could not sleep unless propped up on a few pillows. His mother was 49 years old when he was born. Dr. Weston A Price,[10] who was of the opinion that the pituitary gland was responsible for the defective breathing and sleeplessness decided to operate. He opened the median maxillary suture and widened the upper or maxillary arch in gradual steps to a half inch in width by an appliance with screw at weekly intervals from April 15 to Nov. 26, when two porcelain teeth on a restoration were placed permanently, to cover the space. The bone filled the rest of the space rapidly. The lateral movements and outward rotation of the temporal bones straightened and lowered the sphenoid bone giving more cranial bone space to the brain and the pituitary gland thereby, releasing the compression pressure, and enabling the brain and pituitary gland to function freely again. This boy passed through the stages of development, from infancy to adolescence, within several weeks, which would ordinarily take several years. His genitals developed from those of a child to those of a young man within 3 months. He grew 4 inches in 4 months, and a moustache in 6 months when he began to shave. His mental development was similarly phenomenal. He associated with boys and girls his own age and dated them to dances. He traveled distances alone, bought his own clothes, gave and received the correct

change. An incident that was very interesting occurred about 8 months later—he loosened the mouth appliance which became dislodged. The maxillary bones settled together, and he lapsed into his old condition of lethargy and slipping mentality. Dr. Price immediately replaced the mouth appliance, setting it securely in place, and the boy soon returned to his former improved condition. This confirms the fact that the small cranial bone case compressing the brain contents and pituitary gland is responsible for the inhibited functions and retardation. If such an operation could be performed on small children from 3 years to 5 years of age, it is possible that they would develop and function as normal children, and they would be more pliable and adaptive to learning.

There are two new technical procedures that may be of help to the retarded child. One is a Cleft Palate Rehabilitation Center at the Jewish Chronic Disease Hospital of Brooklyn, New York where dental research is being done. If one can create an artificial cleft palate through surgery in a young child suffering from congenital acromicria syndrome by separating the maxillary bones and placing two porcelain teeth on a restoration to fill the space, this will help to bring the floor of the brain downward, and thus free the brain and pituitary gland for normal activity. The separated bone heals rapidly. And the second procedure is a technique developed by Dr. W. J. Fry[11] and coworkers at the Biocoustics Laboratory, University of Illinois, employing a focused beam of ultrasound above the range of human audibility, 15,000 to 20,000 cycles per second, usually tuning it to one million cycles per second, destroying diseased sections of the brain or central nervous system tract areas without disturbing normal cells or blood vessels, thereby removing malfunctioning, localized pathological brain and central nervous system areas of the gray and white matter, with the hope of improving the mental retardation, behavior problems, and help eradicate many of the other pathological symptoms. Over a period of 5 years, Dr. Fry succeeded in his animal experiments using the ultrasonic machine, and interested groups of neurosurgeons, who feel they are ready to treat the pathological brain of human beings with ultrasonic irradiations.

5. *Proper Nutrition, Drugs, Minerals and Vitamins.* The proper diet for the affected children should consist of a caloric intake daily to meet the needs of the child in accordance with its

age, height, build and weight, a diet of wholesome, palatable and easily digestible foods of high protein value of meats and vegetables, a moderate amount of carbohydrates, and low fat content. The foods may be selected from dairy products, green and yellow vegetables, meats, fish, seafoods and weeds, poultry and eggs, cereals and wheat germ meal, breads, crackers, cakes, fruits and fruit juices. Prunes and prune juice may be added to overcome constipation and constipating stools. Apple juice with acerola may be taken by children who are allergic to citrus fruits and juices which enables them to ingest sufficient amounts of vitamin C. Buttermilk, cream, evaporated milk mixtures, and pasteurized vitamin D homogenized milk make up delicious drinks. Many of the necessary vitamins and minerals are supplied by the daily diet from the above groups of food stuffs. Since the exceptional children are more deficient in fatty soluble vitamins and in mineral content than the normal child, they need supplementary vitamins and minerals to compensate for their deficiency.

Drugs: Children who suffer from petit mal and grand mal seizures require anticonvulsants. I have had excellent results in such cases with the use of suspension and capsules of milontin. In the emotionally disturbed children and behavior problems, many who were affected with athetoid and choreic form movements, improved with the administration of thorazen, reserpin, tolseram suspension and tablets, vitamin B_6, elixir of Gabail, alone or in combination with two of the preparations and elixir betallin S. The specific indications and individual idiosyncracies had to be met for each child. When properly administered, none of these drugs are habit forming. As to the vitamin and mineral supplementary supply, I have the children take a teaspoon of the syrup of minerals twice daily, and triple the usual supply of fat soluble vitamins taken daily by normal children. For the anemic and undernourished child, I have them take vitamin B_{12}, 25 mcg. twice daily, and the usual daily requirement of vitamin B complex and vitamin C. As to the intake of vitamin E, there is a special need for it, and I wish, therefore, to refer more specifically to it.

In a series of 52 congenital acromicria syndrome children in whom skeletal-muscular incoordination and awkwardness in bodily movements and gait were quite noticeable, and to some of the children in whom muscle rigidity, and in others, muscle atonicity

were prominent, vitamin E therapy was given. The age groups and sex were about equally distributed, and the original condition of the same children were checked as controls. Through the courtesy of Dr. N. Berman, Associate Director of Clinical Research, U. S. Vitamin Corporation, I received a liberal supply of Aquasol E, for this reseach study. Each cc. of Aquasol E contained 50 international units of vitamin E, or the equivalent of 50 mgm. dl-alpha-tocopheryl acetate. The dosage in each case varied from 50 mgm. to 100 mgm. daily in accordance with age, and "muscle group" degree of disturbed function. Careful study and observation of the children treated extended over a period of more than a year. The results were quite obvious. There was definite clinical improvement in the child's ability to sit, stand alone, walk, run, climb stairs, and the little patients did not tire as they did before the therapy. It also increased the effectiveness of other therapy such as speech and physiotherapy. Martin and Moore,[12] and others, have shown, by animal experimentation, the close association of vitamin E and hormone effects. They noticed the deposit of acid-fast brown pigment in the muscles of white rats fed on vitamin E free diets, and, also, that in male rats the testes atrophied. Rats treated with progesterone would not show this pigment, those treated with estrogenic hormone had increases of pigment deposits and became worse. It was also noticed that vitamin E deficiency animals would lose a great deal of subcutaneous fat. Vitamin E therapy helps the distribution and metabolism of lipids in the organism. It preserves vitamin A storage and under certain circumstances protects the liver against injury. Fibrositic changes are noticeable in vitamin E free fed rats, muscular tissue is improved with vitamin E therapy. This vitamin is considered a connective tissue vitamin. N. Malamud[13] and coworkers have found degenerative and demyelinated nerve changes in the spinal cord tracts and gracilis nucleus of animals. Various enzymes affect vitamin E deficiency by decreasing muscle transamination and this diminished enzyme activity reflects in fibrotic substitution for active muscle mass when concerned with protein or amino acid metabolism. Normal intake of vitamin E increases the tendency for improved enzyme activity, and amino acid metabolism with healthier muscle mass and activity. I have found Aquasol E to be a valuable therapeutic vitamin synergistic with

the other vitamins and endocrine therapy in not only improving the muscular coordination and locomotion, but also the more important function which is the maturation processes, such as myelination of nerve sheaths, and maturing of the gray and white matter of the brain and spinal cord, and in the general growth and developmental state of the child. Philip L. Harris[14] found a-tocopheryl acetate superior to free a-tocopherols in biopotency and stability. Maturation of the immaturity so noticeable in congenital acromicria syndrome children development and mental processes is the sole aim in our therapy to help them.

Sicca-cell therapy first introduced by Dr. Paul Niehans, and administered by Dr. Haubold of Munich, Germany and by the author in congenital acromicria syndrome will be covered in a separate article in a future issue.

7. Psychological Guidance and Education. The author finds psychometric and I.Q. recordings grossly inadequate. H. Michal-Smith[15] states, "The I.Q. test is already becoming an object of suspicion as the sole, or even major, criterion in determining mental deficiency." To quote Michal-Smith[15] again, "None of the tests and diagnostic methods that are used today in the attempt to determine mental deficiency nor any combination of them has been proved to have any high degree of accuracy." It is practical that after a child is tested by a scattering of revised Stanford-Binet scales (L & M), Leiter and Arthur performance tests, Gesell developmental schedules, the draw-a-man scale, and Vineland social maturity scale, and where available, the Rorschach tests, and his intelligence rating is evaluated, we should include his performance abilities in the home, his known vocabulary, his environment awareness, and the proper performance and ability to dress, to eat, to go to the toilet, to bathe, to get along with others socially; school work reports from his teacher should be part of a history given to the psychologist. Then, and only then can an intelligence evaluation be of value. When this is done, we can rate the child in accordance with what he knows, what he understands, his abilities, and what his habits and social life conduct are, into four divisions, M-1, or a high degree of mental comprehension; M-2, or a moderate degree of mental comprehension, both of which groups of children could be educated; part of M-3 or a poor degree of mental comprehension, some of

whom are educable, and the others only trainable; M-4 or a very poor degree of mental comprehension, who may be helped only to some degree in a helper-training program. All of the children should be educated and trained in a well planned vocational outlined program in which the fundamentals of arithmetic, reading, and writing are included.

A system of day-camps should be inaugurated with indoor class work, and outdoor, "weather permitting" farming, gardening, building structural work, recreational games, and when indoor, needle trades, millinery, arts and crafts can be taught. Sociables can be held Saturday for teen age children, properly chaperoned. After graduation, the graduates should be placed in positions for pay by state employment centers.

Exceptional children should be taken out on visits to relatives, friends, parks, picnics, museums, and on trips. They should be accepted by the doctor, parents, relatives, teachers, and be treated as well as educated and trained to be useful, to enjoy work, play, and social mixing in their communities.

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THORAZINE IN THE TREATMENT OF MENTALLY RETARDED CHILDREN*

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Following the discovery of Chlorpromazine as a valuable adjunct in the treatment of mental and emotional disorders, it has been widely studied and discussed. A summary of experiments up to May 1, 1954 was published in the Journal of the American Medical Association.[12]

Gatski[3] experimented with Chlorpromazine in the treatment of emotionally maladjusted children at Danville, Pennsylvania. From a population of 150 children (all psychiatric problem cases), nine acutely disturbed boys were chosen for study, starting with a dose of 10 mg. daily. The dose was increased up to 40 mg. a day to the point where the children became relaxed and calm. All children showed an improvement within a week. Beneficial effects lasted from ten to twenty-one days after the treatment terminated. There were no unusual side effects. The boys attended classes and play groups while undergoing treatment.

T. S. Davis[4], in a letter to the Lancet, reported on Chlorpromazine in the treatment of mentally deficient children. Of 32 cases, five improved dramatically, nineteen improved distinctly, and six failed to respond. Low-grade defectives improved more often than high-grade. In those whose condition was improved, destructiveness and aggressive tendencies were noticeably diminished and hyperkinetic activity ceased.

Freed and Peifer[7] reported on the treatment of hyperkinetic emotionally disturbed children with Chlorpromazine. Twenty-five children (20 male and 5 female), were treated over a period of 4 months to 16 months. Patients were usually started on doses of 20 mg. three times a day, and the dose was then "tailored" to individual patient response, i.e., to maintain the child in a calm state

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The drug, Chlorpromazine (Thorazine), for part of this study was supplied by the manufacturers, Smith, Kline and French Laboratories.

without undue drowsiness. Doses ranged from 10 mg. to 250 mg. a day.

Improvement was marked in eighteen of the twenty-five patients. The outstanding manifestation was a lessening of hyperactivity. Drowsiness, the chief side-effect, was noted in seven children.

Bair and Herold[1] experimented with Chlorpromazine in treating hyperactive, mentally retarded children. The ten most hyperactive children at the Training School were chosen for treatment. Ages ranged from 7 to 20 years with a mean of 13 years. Both experimental and control groups were tested before and after therapy with the Columbia Mental Maturity Test. Before therapy the experimental group ranged in I.Q. from 22 to 83 with a mean of 53.7. Twenty-five mg. of Chlorpromazine were given three times a day for sixty days. There was an average increase of 10 points in I.Q. for the experimental group. The controls, on the other hand, only gained 2.5 points in I.Q. on the average. The difference between the means was significant at the 1 per cent level. Of the ten cases, seven showed marked improvement, two improved favorably and one showed no improvement.

Procedure. At the Wrentham State School, fourteen hyperactive boys were chosen for study. They ranged in age from 8 to 14 years, with an average of 11 years. There were nine controls, aged 9 to 13 years. Binet intelligence quotients for the experimental group ranged from 41 to 74, with an average of 62.9; the controls ranged from I.Q. 47 to 74, with an average of 62. Clinical diagnoses are shown in Table 1.

TABLE 1. *Clinical Classification*

	Experimental	Control
Familial	11	8
Post-traumatic (natal, twin)	2	..
Post-infectional	1	..
Idiopathic	..	1

The Administration of Thorazine. All children received Thorazine orally. At first, small doses were administered, then increased later. The children were divided into two groups: (a) physically strong and older, and (b) physically, rather frail and young. The first group received 25 mg. daily as an initial dose which was gradually increased over a period of a week to 25 mg. twice daily,

and then to 25 mg. three times and four times daily. Ten mg. of Thorazine was added during the last two weeks of the second month. In the second group the initial dose was 10 mg. twice daily, and was gradually increased over a two weeks' period to 10 mg. four times daily. Thereafter, the dose was increased to 25 mg. three times, and later to four times a day. No serious side effects were encountered, except that three of the children felt a slight drowsiness for a few days within the first month of treatment. The treatment was discontinued for five days with one of the younger patients because of pneumonia. This boy showed one of the best reactions to Thorazine. Three of the boys had pyrexia (99°-100° F) alternately, probably the result of a slight upper respiratory infection. Weight gain was remarkable in three children only. The blood count was made before, during and after administration of Thorazine which revealed no abnormalities and remained within normal level. Moderate hypersomnia was noticed in the majority of the children.

All children were tested, with the Wechsler Intelllgence Scale for Children, before treatment, and again at the close of treatment. Classroom teachers and matrons were asked to report observations in writing.

RESULTS

A. *Intelligence test results* are shown in Tables 2 and 3. The

TABLE 2. *Childrens' Wechsler Intelligence Scale—Experimental Group*

Number		Test 1 I.Q.		Test 2 I.Q.	Gain in I.Q.
1		.62		.70	8
2	Below	.46		.59	13 plus
3		.66		.71	5
4	Below	.46	Below	.46	0
5		.57		.85	28
6	Below	.46	Below	.46	0
7		.63		.77	14
8		.72		.74	2
9		.64		.68	4
10		.69		.79	10
11		.48		.64	16
12		.68		.70	2
13		.63		.75	12
14	Below	.46		.59	13 plus

average gain in I.Q. of those scorable was 10.1 points. The average gain of the controls was 7.6 points.

TABLE 3. *Childrens' Wechsler Intelligence Scale—Control Group*

Number		Test 1 I.Q.		Test 2 I.Q.	Gain in I.Q.
1		.55		.59	4
2		.48		.54	6
3		.76		.81	5
4		.74		.83	9
5		.72		.83	11
6	Below	.46		.51	5 plus
7		.50		.54	4
8		.74		.88	14
9	Below	.46	Below	.46	0

B. *Reports from the classroom teachers.* Two boys showed marked improvement. The teacher reported: "Fred (14) has shown great improvement. He is quieter and behaves much better. His school work is better." Fred's gain in I.Q. was at least 13 points.

"William (11) has been doing all his school work in a satisfactory way and is very cooperative."

Six boys showed moderate improvement. The teachers' reports included the following: "Thomas (1) is erratic at times, but has improved on the whole. He shows more interest in school work."

"Edwin (2) seems to have more power of concentration."

"Keith's (3) school work has improved over last year. In the last two weeks Keith's appearance has improved. He has a very easy-going manner and is wellbehaved."

"John (9) is doing fine work."

"John (4) is eager to do his school work with a fair amount of achievement."

In the case of Harold (5), the teacher reported: "Harold's work is very good and neat."

To sum up, eight boys, or 57 per cent, showed marked to moderate improvement.

C. *Reports from the building matrons.* There was a marked improvement in two cases. The matron stated: "about three days after taking Thorazine, Raymond (6) became quiet; before treatment he was very destructive and would fight with the other boys. There has been a great improvement in his behavior."

In the case of the other boy, William (11), the statement was made: "great improvement; he showed more cooperation and became quieter. His sleeping habits improved, and he no longer

awakened the other children at night. He is an entirely different boy."

In two additional cases other matrons reported "slight improvement." "Edwin (2) is more cooperative and not so quarrelesome." "Harold (5) is not so quarrelsome and is more cooperative."

In one case an adverse effect was reported as follows: "the treatment seems to make John (12) more troublesome and talkative. He has been more subdued since treatment was discontinued."

In the remaining nine cases, the matron reported "no improvement."

The matrons also were asked to state whether the improvement was maintained after treatment ceased. It was maintained only a day or two in the case of William (11). However, in the case of Raymond (6), the matron reported, one month later: "he is still quiet and getting along very nicely. He is working in the ward, and in warm weather works on the farm."

Considering this latter report we may theorize that in certain cases of maladjustment Thorazine may serve as an initial impetus toward an improved social integration, which—if circumstances are favorable—may be maintained after cessation of therapy.

DISCUSSION AND SUMMARY

The important role of the hypothalamus on emotional behavior has been shown by Hess and Akert;[10] Bard;[2] Brugger,[3] and Gellhorn.[9] According to Kopera,[11] Thorazine acts on the hypothalamic regulation of the autonomic nervous system.

In our study, most of the changes took place in behavioral paterns as Gatski[8] stated. Thorazine seems to be effective with patients who show strong pressure response to Mecholyl (Durling, Esen Mautner[6]).

Fourteen hyperactive and emotionally disturbed, mentally deficient boys were treated with Thorazine at the Wrentham State School for a two months' period. In school work and in classroom behavior, two boys showed marked improvement, and six boys showed moderate improvement (57 per cent). Reports from the building matrons indicated that two boys showed marked improvement, and two showed slight improvement (29 per cent). In one case, the improvement was maintained for at least one month after therapy ceased. However, in the case of John (12) adverse effects were observed, that is, he showed erratic behavior. It is possible

this behavior was only simulated. In our study with a relatively small group of children, the familial type of mental deficiency responded more favorably than post-encephalitic and post-traumatic natal cases.

To summarize, marked improvement was shown by four children. The majority showed a moderate improvement in school work, and in general behavior. Hyperactivity, destructiveness and aggressive tendencies were lessened, and cooperative behavior became more evident. The average gain in I.Q. of those scorable was 10.1 points. The average gain of the controls was 7.6 points. Gains in the intelligence tests can be attributed to increased emotional control.

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RUBELLA AS A CAUSE OF MENTAL DEFICIENCY. B. H. Kirman. (Lancet, 2:1113-1115, Nov. 26, 1955).

The author presents details of eight mentally defective children whose mothers had rubella in early pregnancy. Rubella was thought to be responsible for mental defect and other anomalies in seven of these cases. These patients were found among 791 mentally defective persons, mostly children. They make up 0.9%. All seven children were born between 1943 and 1945: six are untrainable idiots; one is above imbecile level but is blind; four are blind through cataract; and deafness was established with certainty in one child. Maternal rubella is one of the many causes of mental deficiency and brain damage that are being discovered, but it accounts for only a small proportion of all cases of mental defect.

—*J.A.M.A.*

PEDIATRICS AT THE TURN OF THE CENTURY

From time to time the Archives, which was the first Children's Journal in the English language, will reprint contributions by the pioneers of the specialty over fifty years ago. It is believed that our readers will be interested in reviewing such early pediatric thought.

ERYTHEMA NODOSUM

A Definition and Illustration

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Erythema nodosum may be defined as an acute infectious disease, closely akin to the exanthemata, i.e., characterized by a period of incubation, of invasion, of eruption, of desquamation and by being contagious.

Etiology. The disease is most common in childhood, and is rare in infancy, being seldom seen under three years of age. It reaches its maximum of incidence about the tenth year, occurring with less frequency after this time until the early part of the third decade, when it again becomes more common. It is infrequently seen in later life.

In early childhood the sexes are about equally affected, but later girls are more frequently attacked than boys, while in adult life it is almost confined to the female sex. Like the exanthemata, it occurs most frequently in the spring and autumn. The exciting agent is unknown. Its contagiousness is but slight, but sufficient evidence has been adduced to prove that it is contagious.

Symptomatology. Incubation. This period usually extends from eight to ten days.

Invasion. This ordinarily occupies about three days, sometimes as long as a week. As a rule the symptoms during the invasion are slight and may be overlooked. They consist of malaise, anorexia or slight gastric disturbance; at times there is an irregular temperature, some postration and more marked gastric symptoms; more rarely the condition may be typhoidal, and even meningitis be suspected.

At the time of writing this paper, the author was Attending Physician to the Out-Patient Department of Bellevue Hospital, New York.

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Eruption. This consists of the appearance of widely separated painful nodes under the skin, which find their site of election on the legs, especially the anterior and inner aspects. These nodes or lumps are frequently visibly elevated but can be even more readily determined by touch. They are red, sometimes bright, sometimes dusky, and vary in size from that of a pea to that of a man's fist, but are commonly one-half an inch to an inch in diameter. They are smooth, indurated, and at times fluctuating; they merge insensibly into the surrounding tissue, and are very sensitive to the touch. At times and especially on other parts of the body they are papular. As the lesion grows older the color takes on the changes peculiar to a bruise. So characteristic is this that the French have for the disease the synonym *dermatite contusiforme.*

The eruption appears earliest and most abundantly on the legs, but frequently on the dorsum of the feet and hands, the thighs and forearms, more rarely on the forehead. As a rule it respects the trunk, but occasionally a node is found there. It is roughly symmetrical. The nodes occur in crops, each lasting a few days, so that the lesions are seen in various stages of development and retrogression. They are painful subjectively as well to the touch.

Over the node as it disappears a desquamation may occur, usually fine, more rarely in flakes. This period of eruption continues two or three weeks, not infrequently four to six weeks, sometimes two to three months.

During this stage there is an irregular febrile movement, often slight, usually mild, but at times as high as 102° or 103° F.; there is often a good deal of irritability and prostration. Joint pains are common, but frank involvement of the joint rarely occurs. Convalescence is established without incidence, except for a rather persistent anemia in many cases. Complications are rare and have reference in most cases to vesication, pustulation, ulceration and even gangrene of the nodes.

There are two questions in connection with this disease which have long been and still are under discussion; namely, its relationship to erythema multiforme and its relationship to rheumatism.

Both dermatologists and pediatrists are about equally divided in considering erythema nodosum on the one hand as an inde-

pendent morbid entity, and on the other as but one of the expressions of an erythema multiforme. Perhaps it would be fair to say that the conception of the disease in question as a separate disease has grown of late. If erythema nodosum be granted to be but one of the many manifestations of erythema multiforme, at least it must be conceded in turn that it has differences from the group at large far more striking than any other of the members.

In erythema nodosum the lesion has more of the inflammatory character, is deeper seated, and instead of being merely a local eruption, at most hinting at infection as in erythema multiforme, it has all the characteristics of an exanthem; a period of incubation, invasion, eruption and desquamation; signs of constitutional disturbance and proven contagiousness; moreover it has a predilection for childhood and youth, while erythema multiforme affects all ages indifferently. Other minor points of difference might also be detailed.

That erythema nodosum occurs with rheumatism is well known to all students of the subject, but that erythema nodosum occurs in patients who have no rheumatic history is equally well known.

Schlesinger, in a recent article, has described two forms of the disease; one, the idiopathic erythema nodosum, having the clear-cut features pictured above; the other, the symptomatic erythema nodosum, which may occur in the course of rheumatism or in the course of most of the infectious diseases. This variety is associated with erythema multiforme and is less typical in its eruption and its course. The lesions are smaller and show a transition into erythema multiforme while the constitutional symptoms are more variable.

Erythema nodosum occurs rather strikingly with purpura, coming on during an attack of purpura or itself, as the primary lesion taking on a purpuric character. Both lesions affect especially the legs.

The association with eczema is well recognized and its presence in tubercular subjects often reported.

Cases have been noted with almost all infectious diseases, for example, typhoid fever, scarlet fever, measles, diphtheria, influenza, pneumonia and erysipelas.

Pathology and Pathogenesis. The lesion is essentially an exuda-

tion into the skin, dermis and hypodermis. An angioneurosis seems to determine its inception, but a true inflammation is added to this. The inciting cause is a toxin or more probably the presence of bacterial emboli.

Type case from the records of the Out-Patient Division, Bellevue Hospital, Children's Department, First Medical Division:

A boy of fifteen years, born in this country, and already a wage earner, whose work kept him confined to a factory during the day. Both parents are healthy and have two other children, both well. The patient has had no other previous illness and has no rheumatic history. He presented himself at the clinic on April 10, 1905. His present illness began suddenly with a feeling of malaise, pain in the legs, the knees, especially in the calves and in the toes. At the same time there appeared an eruption on the shins and later on the thighs, painful to the touch. His appetite has remained fairly good and bowels regular.

Physical Examination. On the shins were found scattered, discolored spots that looked like old bruises, which the patient pointed out as the sites of the painful lumps. On the anterior and outer sides of the thighs were several red elevations in the skin, presenting indurated areas, shading off into the normal skin and very painful to the touch. They vary from half an inch to an inch in diameter, are movable on the deep tissues, pale slightly on pressure, the color returning immediately on relieving the pressure.

The heart, lungs, abdomen and throat were negative, there were no evidences of rheumatism, tuberculosis or syphilis. Temperature was 101° F. by mouth. Salicylates were ordered, seven grains every two hours.

April 12. Patient felt no better in spite of the antirheumatic treatment instituted. Two new nodules had appeared on the right thigh and one on the left. Some of those seen two days ago were disappearing.

April 14. In general the patient felt better, but said that the pain had come back again in the knees. Examination showed no articular involvement. One new nodule had appeared on the outer aspect of the left thigh, one on the inner aspect of the right calf and one on the back of the right hand. The heart showed no involvement. Temperature 102.6° F. Pulse 120. Leukocyte count 11,600. Polymorphonuclears 76 per cent. His appetite remains good.

April 17. Pain is greatly relieved, but there was no interruption in the progress of the disease. Four new nodes had appeared on the right shin, one on the anterior aspect of the right thigh and one on the anterior aspect of the left thigh. The last had an area almost necrotic and was exquisitely sensitive to the touch. Temperature 102° F. Heart negative.

April 19. The pain in the legs was still persisting. No new nodules had appeared and all the old ones had subsided except the one last noted which was much smaller. Temperature 99.6° F.

April 24. There were no nodules and no pain in the legs, but an entirely new symptom had appeared in pain and tenderness beneath the costal arch on the right side in front. The costal arch on this side was quite rigid to palpation, a sign the significance of which as indicative of inflammation in this region was emphasized by Dr. Ellsworth Eliot, Jr., a short time ago. The pain was much increased on deep inspiration, and if the fingers were hooked under the ribs, in the manner advised by Murphy to elicit evidence of gall-bladder disease, the pain was intense. The gall-bladder was not palpable. There was no icterus and no gastric disturbance. Auscultation over this area elicited no signs. On the 22d, two days previous, he had had a similar pain in the corresponding area on the left side and also in the lumbar region on the same side. His temperature was 99.2° F. Leukocyte count 12,000. To our great regret, after this date the patient escaped from observation.

Nobody could have seen this case without being impressed with the picture of an acute infection, of which the eruption was but a single manifestation. The elevated temperature, the accelerated pulse, the malaise, the fretted, almost lachrymose, countenance (mentioned by some writers as characteristic), all bespoke more than a mere skin eruption. The two counts of white blood cells 11,600 and 12,000 might be taken to indicate a leukocytic reaction against toxic agents, while 76 per cent. of polymorphonuclears is a pretty liberal percentage in the blood of a boy of that age.

A feature of especial interest in this case was the deep-seated pain in the hypochondria, which might suggest some visceral complication, or the possibility of a lesion similar to that of the skin occurring in the diaphragmatic attachments.

The treatment of salicylates seemed in no way to shorten or otherwise modify the progress of the disease.

SEPSIS IN A NEWLY-BORN INFANT*

Report of a Case

A. Jacobi, M.D.
New York.

G., male, was seen at 9 P.M., April 5, 1905, with Dr. Baran. Is the third child of the family. No miscarriage. First child was an eight months baby; died on the second day. Mother had been sick and under treatment for several months previously. Second child was delivered by Dr. Baran, and is in good health. No family disease, particularly no hemophilia.

History. No written records were kept. The following history was elicited from the physician: Nothing was noticed until the fourth day. Then heavy uric acid infarctions were discharged. That lasted until the eighth day. It recommenced on the ninth and lasted to the tenth day. Urine was pale on the eleventh. No examination was made. Quantity fair. Circumcision on the eighth, with no accident. Purpuric spots of small size were seen on the extremities on the ninth day.

Hematuria appeared on the twelfth and continued. On that day a consultant was called in. He found what has been described, and both kidneys swollen. Is reported to have diagnosticated tumors of both kidneys.

The cord fell off on the fifteenth day, April 4. Was seen by me on the sixteenth, April 5, 9 P.M. Air of the room good; window had been kept open; bedding clean; plumbing appears to be in order. Mother in fair health; sitting up; has no fissures in her nipples. No history of tuberculosis, or syphilis. Baby still weighs nearly six pounds; is said to have lost considerably. Mouth and nose normal; lips dry; somewhat fissured in the corners. Ears appear negative. No diarrhea. No malformation. Purpuric spots, small and large; some with slight elevation of the surface, over chest and epigastrium; some on face, shoulders, arms, fingers. Some painful livid elevations (suggesting the presence of pus in the deeper tissue). Icteric discoloration not noticeable in gaslight; is reported to be trifling. The liver large, as usual at that age. The spleen was not felt; percussion negative. The right kidney was not felt. The left kidney felt like the size of a hen's egg, hard

* Read before the Seventeenth Annual Meeting of the American Pediatric Society held at Lake George, New York, June 18, 1905.
Reprinted from Archives of Pediatrics, 22:801-803, November 1905.

and smooth. Respirations about 60; pulse 200; temperature 104.5° F. Heart negative. Umbilical stump has some bloody oozing; is covered with some boracic acid, with which it has been dressed all along. The condition of the child appeared to warrant no close examination of the lungs, nor of the blood; no vein being in view or accessible under the circumstances. The baby died the next day.

Autopsy at 9 P.M., six hours after death. Surface as described in the living; some of the spots paler; some more livid. A moderate amount of serum, tinged with blood, in the pericardium. On it numerous petechiæ. Heart negative; thymus small, negative. Four of the lobes of the lungs have disseminated hemorrhages; some quite superficial, pleural and subpleural; some infarctions, mostly triangular of ½-⅔ cm. in depth. Some atelectatic places in both sides posteriorly. Peritoneum holds a few ounces of blood-tinged serum, and shows a few petechiæ on the abdominal wall. Both costal pleuræ covered with petechiæ, and a few extensive extravasations. Liver as large as normal; negative. Umbilical vein and ductus, Arantii, normal; not ulcerated. Spleen small; negative. Stomach exhibits circumscribed blood points in the mucous membrane. Many extend down to the submucous tissue. These changes are mostly found in the pyloric part.

Umbilical stump large; slightly eroded; covered with a scab of coagulum and boric acid. The pelvic connective tissue is black with blood. Both adrenals small; rather more so than normal.

Left kidney enlarged to almost twice its size; dislodged downwards from 4 to 5 cm.; capsule penetrated with blood; some clots between capsule and kidney; no open blood vessel found; capsule also thickened with fat. The upper part of the kidney forms a black, almost uniform looking mass, which so swells the tissue that fetal lobulation becomes indistinct. The right kidney is similarly changed, but to a far less degree. Section of the left kidney exhibits some small uric acid infarctions which are still held in the pyramids.

A few points are of unusual interest:

1. Uric acid was discharged in large quantities from the fourth to the eighth day; then again from the ninth to the tenth. Small hemorrhages, with or without secondary nephritis, are not very rare after uric acid infarction, but the suspicion that the foreign bodies might have caused the hematuria was soon dismissed.

2. It is certain that almost every floating kidney found in early age is congenital. As this baby had been lying down all the few days of his life, the increase in size should not be charged to the dislodgment of the left kidney.

3. The diagnosis of intra-abdominal tumors, until it be quite positive, should be suspended even in infants and children in whom intestinal contents are rarely misleading. Besides, what we feel inside is exaggerated by the mass at least of abdominal wall which has to be grasped on both sides of the questionable body. The left kidney *was* enlarged by hemorrhage, and was abnormally accessible, and the tumor of a kidney might be suggested by the findings. Still, very few tumors of a kidney ever bleed. Carcinoma does bleed sometimes; sarcoma very rarely; calculi in later life; tuberculosis not in the newly-born; cysts and hydronephrosis not at all.

4. The bacteric cause of this sepsis is not known; nor can we know the mode of its invasion. The amniotic liquor and the milk and lochia of the mother should not be accused as long as she was well and other causes cannot be found. The skin exhibited so many changes that its condition one or two weeks previously can only be guessed. The lips were sore at a late date. The umbilical stump was sore and bleeding. The cord had not fallen off before the fourteenth day; invasion is quite possible during that long time of the cutting of the cord (even the very tissue of the cord, unchanged, may admit microbes, or toxins); and boracic acid is probably not a sufficient antiseptic to be applied as a protection to a vulnerable surface like that of the navel.

THE EFFECTS OF TIGHT DIAPERS*

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The main object of this paper is to deal with some of the disadvantages of the clothing of infants and to advance a few suggestions as to the best means of obviating them. One of the first apparent disadvantages is the discomfort of clothes to the infant and the annoyance incident to its manipulation. After food and warmth, the prime essential for the infant's welfare is rest.

*Read before the American Pediatric Society, Boston, Mass., May, 1902.
Reprinted from ARCHIVES OF PEDIATRICS, 20:88-94, 1903.

Clothing that requires frequent or prolonged handling, which causes discomfort from constriction or pressure, or from skin irritation, which induces fatigue by weight or constraint, or causes overheating or exhaustion, is familiar to us all. It does not allow the infant to rest.

Clothing may interfere with functions, as of respiration by compression of the thorax; of circulation, by constriction of the blood vessels and by restrained muscular movements; of digestion, by interfering with gastric and enteric peristalsis with resulting fermentation, constipation and their train of evils; of elimination, by deficient skin ventilation; of voluntary muscular action, by restraint which prevents absolute freedom of the extremities.

There is no doubt that improper clothing not only may interfere with growth from impairment of function, as above claimed, but it may also cause actual deformities from undue pressure upon plastic tissues in their formative states.

The misshapen head, due to the infant's inability to change position because of its clothing, is not infrequently seen. The constricted chest with undeveloped lungs may not be due solely to rachitis, but to compression. Constriction of the abdomen may favor hernia, permanent gastric and intestinal dilatation, deformed liver with its chondral grooves and atony of all the muscular structures.

That a diaper of unyielding material pinned firmly around the hips of a young infant will compress the pelvis, reducing the diameters is susceptible of demonstration.

The effect of such compression applied continuously throughout the first year of life, it seems reasonable to assume, would be a retardation of pelvic development, if it does not cause a disproportion of the relative dimensions. No one doubts that the thorax may be constricted in growth by prolonged compression.

If this be true of the thorax with its resilient and expansive viscera, how much more pronounced must be the permanent effect upon the pelvic framework with its non-resilient contents?

The ordinary diaper of twilled cotton flannel, firm and unyielding, folded many times, tightly drawn and pinned about the iliac crests to prevent slipping, we know too well. The tension of this ceinture is notably increased by the frequent wetting to which it is subjected. May we not establish a causative relationship between this commonest American diaper and the most fre-

quent American pelvic deformity? Obstetricians are agreed that the dystochias in this country are largely due to justominor pelves. Is there any reasonable doubt that continuous ceinture of the pelvis during the first two years, before ossification has progressed far, will produce the justominor pelvis in women?

The great plasticity of the infant pelvis is easily seen in the moist specimen of a full term infant I now show you. When we remember that the complete pelvis is the result of development from fifty-five centres of ossification, in about a third of which the process has not even yet begun at birth, while from no one of the remaining centres has ossification proceeded to completion, that a large amount of pelvic structure, subsequently to become bone, is purely cartilaginous, the plasticity of this foundation structure of the skeleton is appreciated. Is there any doubt that continuous compression in this stage must inhibit growth? All analogies point to the contrary conclusion.

The practice, also of wadding a large amount of inelastic material tightly between the thighs (which serves as a fulcrum when the lower extremities are firmly bound in apposition by the pinning blanket or other swaddling clothes) tends to cause deformity of the femora.

There is little doubt in the mind of the writer, that many cases of genu valgum have their beginning in this cause. The alignment of the articulating surfaces being thus easily disturbed, the defect is naturally progressive, with the superincumbent weight of the growing body, until the age of complete ossification when the bones and joints show permanent deformity.

To obviate these defects the diaper should be light, with no more material than is absolutely necessary for the absorption of discharges. Absorbent cotton, either loose or in pads, preferably the latter, retained by a T bandage or triangle of some flexible material, such as cheese cloth, secured by safety pins to the shirt, before and behind, has been found to meet all the requirements.

The most prevalent method of clothing infants in continental Europe and some parts of Asia is seen in the "swaddling clothes" retained by a gasket or knitted band around the body. This binds the arms close to the body and the legs straight and in close apposition. This custom is also seen in this country in some families of foreign born people. In many instances the gasket is so closely applied as to restrain all voluntary movements except of the face.

The old-fashioned English and American costume consists of a short, sleeveless linen shirt; the "pinning blanket" or "barrow coat," a straight, firm waist band of cotton cloth, to the lower edge of which is gathered a long flannel breadth, extending eighteen to twenty-four inches below the infant's feet. The band is pinned smoothly and tightly around the thorax and the lower flannel portion folded together and brought up and secured by pins. This is followed by the regular skirt composed of flannel amply shirred to another waist band, which is also tightly pinned. Over this is a cotton or wool slip, with or without sleeves, which adds weight to the already crushed infant. Often a crocheted or knitted jacket is worn outside.

In recent years many intelligent nurses have adopted a more hygienic clothing, of which the "Gertrude suit" is a good illustration. This consists of three garments, neither close fitting shirt nor binder being used. All these garments are cut in the princess style, supported from the shoulders and extend well below the feet, the inner and outer garments having sleeves to the wrists. To this may be added short socks, and moccasins in cold weather.

To secure the benefits of clothing, and at the same time freedom from its injurious effects, is a problem, the solution of which is widely sought. The ideal protection would seem to be afforded by a large blanket of light, flexible, non-conducting material enveloping loosely the entire infant below the neck, but his normal restlessness makes it difficult to keep him within the folds of this covering. A more definite garment that cannot be thrown off, while still allowing unrestrained freedom of necessary movements, was shown by the writer before the Pediatric Section of the American Medical Association at Baltimore in 1890, and also presented by invitation to the Société d'Hygiene Français at Paris in 1897. This garment is in use in the infant wards of some of the hospitals of Chicago and other cities. It is a bag, so constructed that it envelops loosely the entire body below the chin, closure being secured above by safety pins and below by a draw string. Additional protection against cold is afforded by separate under garments, such as a light knitted shirt of silk or wool, free from seam or band, and one or more sleeveless slips, as occasion may require.

DEPARTMENT OF ABSTRACTS

Conducted by
MICHAEL A. BRESCIA, M.D., New York

KRIEDBERG, M. B.; DAMESHEK, W. AND LOTARRACA, R.: ACUTE VASCULAR (SCHÖNLEIN-HENOCH) PURPURA—AN IMMUNOLOGIC DISEASE? (New England Journal of Medicine, 253:1014, Dec. 8, 1955).

Fifteen cases of acute vascular purpura are discussed. Infection preceded the onset of purpura in all. The latent period between remission of the infection and the appearance of purpura may be the time during which, in response to an antigenic stimulus of unknown nature, an immunologic mechanism develops. An immunologic "storm" with an antigen-antibody reaction at the end organ, (small blood vessels), probably determines the picture of acute inflammatory perivasculitis found in the walls of the small blood vessels of the corium, capillaries of the synovia, glomeruli of the kidney and small blood vessels of the walls of the intestines and in turn explains the varied symptomatology.

AUTHORS' SUMMARY.

GIBBS, E. L.; FOIS, A. AND GIBBS, F. A.: THE ELECTROENCEPHALOGRAM IN RETROLENTAL FIBROPLASIA. (New England Journal of Medicine, 253:1102, Dec. 22, 1955).

In 51 cases of retrolental fibroplasia, electroencephalographic recordings were obtained in the waking and sleeping states. Although only 27 per cent of the patients had some form of clinical epilepsy, seizure activity was present in 88 per cent of the entire group (in 100 per cent of those with seizures and in 70 per cent of those without seizures). The clinical history of seizures and the occurrence of mental retardation suggested brain disorder in some cases, but the present study indicates that brain disorder may occur in cases of retrolental fibroplasia. The frequency of seizure activity among younger and older children differed; 50 per cent of those under, and 97 per cent of those over three years of age had seizure activity. The commonest EEG abnormality was a focus of spike-seizure activity in one or both occipital areas. This occurred in 35 per cent of children under and 74 per cent of those over three years of age. Follow-up studies on children with occipital-lobe foci have shown that this type of focus tends to disappear

with increasing age or to migrate into the midtemporal region. The following circumstances are considered possible causes of the seizure activity in retrolental fibroplasia: trans-synaptic degenerative changes in the brain secondary to blindness in early infancy (structural evidence of such changes has been reported by Von Gudden); oxygen poisoning of the immature brain resulting from excess oxygen in the respired air; and premature photic stimulation

AUTHORS' SUMMARY.

LUND, P. C.: INFLUENCE OF ANESTHESIA ON INFANT MORTALITY RATE IN CESAREAN SECTIONS. (Journal American Medical Association, 159:1586, Dec. 24, 1955).

An analysis of 671 consecutive cesarean sections established that: (1) the variations in infant mortality rates following cesarean sections conducted with modern anesthetic methods and techniques are statistically insignificant when the fetus is full term and no maternal or fetal complications are present; (2) there is a statistically significant variation in infant mortality rates following cesarean section conducted with various modern methods of anesthesia when the fetus is premature and/or various maternal or fetal complications are present (the fetal mortality rate under these circumstances is lower with conduction anesthesia than with balanced or general anesthesia); (3) in the interest of fetal salvage the use of the term "intrinsic mortality rate in cesarean section" should be discouraged; and (4) anesthesia has a marked influence on the infant mortality rate in cesarean section, the over-all infant mortality rate being slightly lower following conduction anesthesia than following balanced anesthesia. AUTHOR'S SUMMARY.

THOMPSON, H. T.: OBSTRUCTION OF THE VESICAL NECK IN CHILDREN. (New York State Journal of Medicine, 56:361, Feb. 1, 1956).

(1) Three hundred and eighty-seven private pediatric patients referred for urologic investigation were found to have obstruction of the vesical neck in 21 per cent of the cases. (2) In all instances, except one, this has been a minimal obstruction with negative pyelographic studies. (3) Minimal obstruction of the vesical neck in children is a clinically important pathologic state and may well be the answer to the so-called non-obstructive chronic pyelonephritis of the young adult. (4) Symptomatology is almost invariably referrable to the urinary tract, except for abdominal pain or

unexplained fever. (5) Complete urologic investigation is indicated. (6) Treatment will lead to the amelioration of the symptoms in the majority of the cases. AUTHOR'S SUMMARY.

POPE, A. S.; FEEMSTER, R. F.; ROSENGARD, D. E.; HOPKINS, F. R. B.; VANADZIN, B. AND PATTISON, E. W.: EVALUATION OF POLIOMYELITIS VACCINATION IN MASSACHUSETTS. (New England Journal of Medicine, 254:110, Jan. 10, 1956).

An unprecedented epidemic of poliomyelitis in Massachusetts in 1955 provided an excellent opportunity to evaluate the effectiveness of poliomyelitis vaccine in an epidemic situation. The main characteristics of the 1955 epidemic are described. The epidemic was due almost exclusively to Type I virus. The possibility that live virus in the vaccine used in May and June initiated the epidemic is discussed. A total of 130 cases occurred among the 137,968 children who received one dose of vaccine, an attack rate of 94.5 per 100,000. Fifteen cases occurred among the 22,673 who received two or more doses, a rate of 66.4. The rate among the 278,532 unvaccinated children (553 cases) was 198.2 per 100,000. The effectiveness of the vaccine for all cases of poliomyelitis was 53 per cent. For paralytic cases only, the effectiveness was 60 per cent. These figures parallel those of Francis and his associates for protection against Type I poliomyelitis.

AUTHOR'S SUMMARY.

VIANELLO, A.: STUDIES ON THE ELECTROCARDIOGRAPHIC FINDINGS IN THE NEWBORN. (Il Lattante, 27:14, Jan. 1956).

The author reports his findings on the electrocardiogram of 50 normal newborns. The readings were taken immediately after birth on 20 and the rest 12 to 24 hours after birth. Repeat readings were taken every 24 to 48 hours until the 8th day and then weekly till the 30th day. The 3 standard derivations, 3 unipolar derivations of the members and 4 unipolar precordial derivations were carried out on each child. At birth the heart rate was 110-120/min. and after the 8th day the rate was 130-150/min. Ventricular extrasystoles were found in two infants. The P wave was flattened at birth, gradually increased in height from the 2nd to the 8th day of life, gradually decreasing in height after that. The average duration of the PR interval is 10.5 hundredths of a second. The Q wave is very clear in D3. The R wave is stressed in the third standard derivation. The S wave is deep

in the first standard derivation. In the thoracic derivations a shift to left of the transition area is noted. The QRS complex lasts on an average 5-6 hundredths of a second. The T wave presents the most important modifications. It was often isoelectrical or negative in D1, D2, V4 and V6 soon after birth. On the 2nd or 3rd day of life, the T wave becomes positive in D1, 2 and 4 but negative in V1 and 2. There is a right ventricular preponderance. MICHAEL A. BRESCIA, M.D.

PHILLIPS, P. H.: RECENT PROGRESS IN DIETARY RESEARCH AND DENTAL CARIES. (Journal American Dietetic Association, 32:110, Feb. 1956).

Recent studies have shown that the rate of oral clearance is a primary factor in the control of dental caries. Further, the composition of saliva may be of great importance in resistance to caries. While fermentable sugars are the principal dietary contributors leading to dental caries, they are not the only dietary cause. Mineral components of the diet are assuming greater importance as our information on the subject increases. Nutritive balance, especially of the mineral elements, is essential to the dietary control of caries. Tooth maturation under favorable conditions greatly favors subsequent resistance to the disease. It appears that certain anti-cariogenic factors may be present in food, or feed. From the evidence available, it must be concluded that diet plays a major role in caries control. AUTHOR'S SUMMARY.

RICH, A. R.: THE PATHOLOGY AND PATHOGENESIS OF EXPERIMENTAL ANAPHYLACTIC GLOMERULONEPHRITIS IN RELATION TO HUMAN ACUTE GLOMERULONEPHRITIS. (Bulletin Johns Hopkins Hospital, 98:120, Feb. 1956).

Evidence is presented that all of the types and degrees of glomerular lesions that characterize human acute glomerulonephritis can be produced experimentally by hypersensitivity to non-toxic foreign proteins, i.e., by a tissue injury resulting from an antigen-antibody reaction. The bearing of this experimental glomerulonephritis upon the pathogenesis of acute glomerulonephritis in the human being is examined and discussed. Focal necrotizing glomerular lesions resembling those that occur in association with some cases of periarteritis nodosa in man can also be produced experimentally by hypersensitivity to non-toxic foreign antigens. AUTHOR'S SUMMARY.

BOOK REVIEWS

Conducted by
MICHAEL A. BRESCIA, M.D., New York

ADVANCES IN PEDIATRICS. Vol. VIII. Edited by S. Z. Levine, M.D. Cloth. Pp. 273. Illustrated. Price $8.00. Chicago: The Year Book Publishers, Inc., 1956.

This last volume in the series of "Advances" contains as usual some interesting and well done reviews of timely and not so common subjects. The subjects are well documented with extensive bibliographies for those who wish to pursue the subject more thoroughly. The volume considers the following subjects: The Etiology of Infantile Diarrhea by Horace U. Hodes; Isosexual Precocity in Boys, including a Case of Gonadotropin Producing Teratoma by Samuel Z. Levine, et al.; Sarcoidosis in Childhood by J. P. McGovern and D. H. Merritt; Offspring of Diabetic and Prediabetic Mothers by Herbert C. Miller; Subdural Lesions in Childhood, with Special Reference to Infectious Processes by M. H. D. Smith; Prevention of Accidents in Childhood by G. H. Wheatley; and Mental Deficiency by H. Yannet. The articles on sarcoidosis and mental deficiency would have been greatly enhanced by appropriate illustrations. Otherwise they are excellent reviews of the subject.

MICHAEL A. BRESCIA, M.D.

PRENATAL AND PARANATAL FACTORS IN THE DEVELOPMENT OF CHILDHOOD BEHAVIOR DISORDERS. By M. E. Rogers; A. M. Lilienfeld and B. Pasamanick. Pp. 157, XLI tables. Baltimore: The John Hopkins University, School of Hygiene and Public Health.

This monograph is a detailed report of a statistical study investigating the relationship between behavior disorders of childhood and possible cerebral damage in prenatal or paranatal life. The statistics for white and non-white groups each were compared with those for appropriate, non-behavior control groups. The study involved 1,151 elmentary school children reported as having behavior problems by the Baltimore public schools and 902 comparable but non-behavior problem children as controls. The authors discuss fully the limitations of their study. This awareness

gives greater weight to their positive finding of an association of material and fetal factors, principally toxemias of pregnancy and bleeding, with hyperactivity and confused-disorganized behavior in childhood. They stress the need for the clinician to be more aware of minimal brain injury as a possible factor and point to the importance for improved diagnostic tools as well as methods of treatment. The present diagnostic tools are "compelte prenatal and paranatal histories, electroencephalograms, neurological examinations and psychological tests." With a complete diagnosis of factors involved in problem behavior at school or at home, appropriate therapy, medical and psychological, can be instituted and more realistic therapeutic goal set. Pediatrists and practitioners, who are responsible for handling or referring behavior problems in children, are advised to acquaint themselves more fully with this study in order to render the best type of care to their patients.

HELEN THOMPSON, PH.D.

PHYSIOLOGY AND PATHOLOGY OF INFANT NUTRITION. By L. F. Meyer, M.D. and Erich Nassau, M.D. Translated by Kurt Glaser, M.D. and Susanne Glaser, B.A. Cloth. Pp. 533. Illustrated. Price $11.50. Springfield, Ill.: Charles C. Thomas, 1955.

This is a fairly comprehensive book on infant nutrition. The authors emphasize the importance of breast feeding and encourage breast feeding at all times. They also decry the early introduction of solid foods and state their valid reasons for so recommending. The chapter on diarrheal diseases is most informative. The authors make a distinction between congenital megacolon and Hirschsprung's disease which are usually considered synonomous terms. However, the differentiation between these two conditions is confusing. They might have had in mind functional megacolon with symptoms occurring later in childhood in contradistinction to congenital megacolon with symptoms present from birth. In referring to pyloromyotomy for the correction of hypertrophic pyloric stenosis, they introduce another eponym Weber-Ramstedt which is better and more appropriately referred to as the Fredet-Ramstedt operation. The translation is good, except for the frequent and improper use of the word "already."

MICHAEL A. BRESCIA, M.D.

EVERY LISTED PEDIATRIC SPECIALIST

was questioned by an independent research organization about an article published in the Archives of Pediatrics. These specialists were asked whether they agreed with the reprint material.

Of the pediatricians who believed their experience justified an opinion, 156—81.7%—replied yes to all three points in question.

4 out of 5 Leading Pediatricians agree that CREAM OF RICE

NEW, ½ Minute Cooking Time—10 Times Faster!
NEW, Easy-Pouring Spout!

a | **gives "more available caloric energy"** than any wheat, rye, barley, corn or oat cereal. Of the 227 pediatricians answering definitely, 192—84.6%—said yes.

b | **is "more easily digestible"** than any other kind of cereal. Of the 248 answering definitely, 212—85.5%—said yes.

c | **gives "nutritional energy more rapidly"** than any other kind of cereal. Of the 220 answering definitely, 178—80.9%—said yes.

In addition, Cream of Rice is

MOST HYPOALLERGENIC, TOO

As reported in the Archives of Pediatrics by Slobody, Untracht and Hertzmark, "rice . . . shows the fewest allergic reactions of any cereal checked . . . Even children potentially allergic to rice have been shown to tolerate it well when it is cooked in the presence of moisture."

WRITE FOR PROFESSIONAL SAMPLES:
GROCERY STORE PRODUCTS CO., DEPT. AP-5
WEST CHESTER, PA.

WHAT BEECH-NUT QUALITY MEANS

FRESHNESS in every jar. Fruits and vegetables are picked at perfection and processed to provide the most in eating pleasure.

PURITY is guarded all the way by Beech-Nut —from the careful washing of every ingredient, to the sterilization of each sparkling glass jar.

FLAVOR is constant. A panel of taste testers makes daily checks to positively guarantee Beech-Nut's uniformly fine flavor.

NUTRITION is another important factor in Beech-Nut quality. Precious vitamins and minerals have been retained in high degree.

VARIETY is the spice of Baby's life with Beech-Nut. There are 5 pre-cooked Baby Cereals, 28 Strained Foods, 26 Junior Foods.

Pediatricians know that Beech-Nut keeps up with the very latest scientific methods developed for taking better care of Baby. Also, the research department at Beech-Nut is continually searching for new ways to improve packaging, to guarantee important flavor control, to preserve all possible nutritional value. It's no wonder doctors recommend Beech-Nut Baby Foods to mothers for their babies.

Beech-Nut
Baby Foods